

REMARKS/ARGUMENTS

Applicant(s) has carefully reviewed the Examiner's Official Action dated April 17, 2008, in which the Examiner rejected claims 1-3, 6, 9-11, 14-20, 22-28.

Amendments to the claims:

Claim 1 has been amended to incorporate original claims 6, 9 and 10. Claim 15 has been amended to incorporate original claim 22. Claims 6, 9, 10 and 22 have been cancelled. Accordingly no new matter has been added.

With respect to 35 U.S.C. 102(b) and 103(a):

The rejection of original claims 1, 9, 10, 11 and 25-28 under 35 USC 102(b) as being anticipated by U.S. Patent No. 6,159,421 (Fujii) is respectfully traversed on the grounds that the Fujii patent neither discloses nor suggests a photoelectric generating plate in which a thickness of the photoelectron emission layer is greater than a maximum surface roughness of an underlying layer thereof, as originally recited in claims 6 and 22 and now recited in claims 1 and 15, much less one in which the photoelectron emission layer is made of a ceramic material selected from the group consisting of titanium nitride, titanium carbide, zirconium nitride and zirconium carbide, as originally recited in claim 10 and now also recited in claim 1.

The Fujii patent clearly does not disclose, teach or suggest the feature recited in amended independent claims 1 and 15 that **a thickness of the photoelectron emission layer is greater than a maximum surface roughness of an underlying layer thereof**. This feature is not merely a matter of design

choice, but rather addresses the problem of a reduction in the number of photoelectrons generated from a photoelectron generating plate caused by the fact that a surface of a photoelectron emission layer in the photoelectron generating plate is coated by compounds defused through pinholes in the photoelectron emission layer. In accordance with the present invention, by setting the thickness of the photoelectron emission layer to be greater than a maximum surface roughness of an underlying layer thereof, the surface of the photoelectron emission layer in the photoelectron generating plate is prevented from being coated by compounds defused through pinholes in the photoelectron emission layer. Thus, the negative particle generating device always maintains a level of the amount of negative particles and the photoelectron generating plate attains a good durability for a long time. As explained below, this has nothing to do with unevenness of the layer, as alleged by the Examiner in connection with the rejection of **claims 6 and 22**, discussed below (the recitation of layer thickness was originally included in claims 6 and 22).

Furthermore, the Fujii patent does not disclose or suggest the feature, recited in independent claim 25, that the negative particle generating device comprises mesh-shaped **photoelectron generating member that is electrically grounded**. According to the invention, a vessel includes therein a light source for illuminating the mesh-shaped photoelectron generating member while air simultaneously runs through a surface of the photoelectron generating member to thereby generate negative particles, the mesh-shaped photoelectron generating member being installed in the vessel so that the air flowing in the vessel impinges onto the photoelectron generating member. Because the photoelectron generation member is therefore electrically grounded, positive holes are created at places from which the photoelectrons are emitted on photoelectron generation

member by a photoelectric effect and an electric attractive force works between the positive holes and the photoelectrons. As a result, even though the generated photoelectrons tend to be absorbed in the positive holes of photoelectron generation member again by the electric attractive force, since electrons are supplemented in the positive holes by means of the photoelectron generation member ground, the generated photoelectrons are prevented from returning to the positive holes and thus there will be no reduction in the number of negative particles generated (page 34, line 4- 17). Consequently, Fuji does not disclose, teach or suggest all of the features of amended independent claims 1, 15, and 25 and withdrawal of the rejection under 35 USC 102(b) is respectfully requested.

On page 4 of the Official Action, the Examiner rejections claims 6 and 22 under 35 USC 103(a) as being obvious in view of the Fujii patent, on the grounds that ***"otherwise the photoelectron emitting layer would have too rough and uneven surface that it would not be able to efficiently emit electrons when being irradiated by the light source."*** This allegation by the Examiner is clearly made in hindsight and completely unsupported by any teaches in the Fujii patent. Nothing in Fujii suggests that an emitting layer cannot efficiently emit electrons if it is round and uneven, nor is it evident that a thinner emission layer would in fact be rough and uneven. AS NOTED ABOVE, THE REASON FOR THE THICKER EMISSION LAYER IS TO PREVENT GENERATED PHOTOELECTRONS FROM RETURNING TO THE POSITIVE HOLES AND THEREBY REDUCING THE NUMBER OF NEGATIVE PARTICLES GENERATED, WHICH HAS ABSOLUTELY NOTHING TO DO WITH THE EXAMINER'S ASSERTION THAT A THINNER LAYER WOULD BE TOO ROUGH AND UNEVEN TO BE EFFICIENT.

The rejection of claims 15 and 16 under 35 USC 103(a) over Fujii in view of U.S. Patent No. 5,853,866 (Watanabe) or 7,049,002 (Greenberg) is also respectfully traversed on the grounds that the Watanabe and Greenberg patents,

like the Fujii patent, fail to disclose or suggest a photoelectron generating plate in which a thickness of the photoelectron emission layer is greater than a maximum surface roughness of the barrier layer. As explained above, the barrier layer of the photoelectron generating plate of the present invention blocks diffusion of a material of an underlying base member thus the surface of the photoelectron emission layer is prevented from being coated by the barrier layer and the surface of the photoelectron emission layer is prevented from being coated by the material of the base member. As a result, temporal reduction in the number of generated photoelectrons can be substantially prevented and the photoelectron generating plate attains a good durability for a long time. In contrast, Watanabe or Greenberg use photocatalytic materials and do not disclose any sort of negative particle emission, much less one in which the negative particles (photoelectrons) are generated by a layer having the claimed thickness.

The rejections of claims 2, 3, 17-20, 22 and 23 under 35 USC 103(a) as being unpatentable over Fuji in view of U.S. Patent No. 6,106,955 (Ogawa) and/or the Watanabe or Greenberg patents is also respectfully traversed on the grounds that the Ogawa patent, like the Watanabe and Greenberg patents, fails to disclose or suggest a photoelectron generating plate in which a thickness of the photoelectron emission layer is greater than a maximum surface roughness of the barrier layer, the present invention features that generating negative particles by the illumination of the light. Instead, the Ogawa patent, like the Watanabe and Greenberg patents, is directed to use of photocatalytic materials which are not subject to the problem solved by the present invention, namely the problem of lack of plate durability due to photoelectron losses with time.

Finally, the rejections of claims 14 and 24 under 35 USC 103(a) as being unpatentable over Fuji in view of Japanese Patent Publication No. JP 2001187390

(Hayashi) alone or Hayashi in combination with one or more of the Ogawa, Watanabe or Greenberg patents is respectfully traversed on the grounds that the Hayashi publication also fails to disclose or suggest a negative particle generator, as claimed, and particularly one in which, as recited in claims 14 and 24, oxygen gas runs through the surface of the photoelectron generating plate to thereby cause the negative particles generated. Instead of negative particles, Hayashi produces ozone or OH radical. Thus, Hayashi does not disclose, teach or suggest the feature of generating oxygen contained negative particles.

Therefore, the present invention as recited in claims independent claims 1, 15, 25 and claims depending therefrom includes features that are not disclosed in the cited references and that are not obvious over the disclosure of cited references. Accordingly, it is respectfully submitted that the rejection of claims 1, 15, 25 and claims dependent therefrom be withdrawn.

CONCLUSION

Applicant believes that this is a full and complete response to the Office Action. For the reasons discussed above, applicant respectfully submits that the pending claims are in complete condition for allowance. Accordingly, it is respectfully requested that the Examiner's rejections be withdrawn; and that claims 1-8 be allowed in their present form.

Should the Examiner require or consider it advisable that the specification, claims an/or drawings be further amended or corrected in formal respects, in order to place the case in condition for final allowance, then it is respectfully requested that such amendment or correction be carried out by Examiner's Amendment and

the case be passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, the Examiner is invited to telephone the undersigned.

Respectfully submitted,
BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to be 'B. Urcia', with a long horizontal flourish extending to the right.

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By: BENJAMIN E. URCIA

Registration No. 33,805

BACON & THOMAS, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314
Telephone: (703) 683-0500